# TECH BRIEF

SFP+ Cables and Encryption
Cost-Effective Alternatives Overcome Vendor Locking

As 10Gb SFP+ cables and transceivers become more common in today's data centers, the question of vendor lock or encryption can become an issue for data center professionals. This paper addresses the mechanism that is used to implement the encryption, why it is employed and how to overcome it.
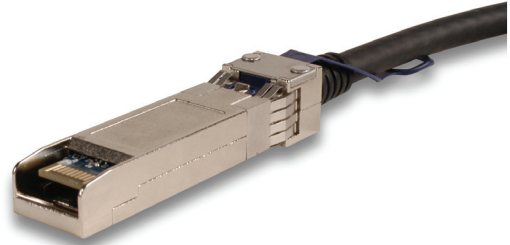
I2C INTERFACE

SFP+ cables and transceivers employ a 2-wire serial interface (called I2C) that allows the network equipment to poll a particular port and get information about the cable or transceiver that is plugged into that port. This interface is also commonly referred to as the Digital Diagnostic Management Interface, Digital Diagnostic Monitoring Interface or DDMI.

The DDMI provides information about the cable or transceiver assembly such as vendor, serial number, part number, and date of manufacture that is stored on a memory chip or microprocessor within the cable assembly.

PCB Termination

Overmold provides additional strain relief to minimize pistoning

Laser stripped conductors

Automated welding for unmatched consistancy

Welding results in less dielectric shrink-back than soldering

SFP+ passive copper cables contain EEPROMs within the connector back shell that have I2C ports. These cables may also be referred to as DAC or "direct attached copper" cables. An EEPROM is an "Electrically Erasable Programmable Read-Only Memory" chip that is programmed at the factory with specific information about the cable assembly.

SFP+ active copper cables and optical transceivers contain microprocessors within the connector back shell. The microprocessor has memory that is accessible to the network through the 2-wire I2C interface. For active cables and transceivers, the interface allows real time access to device operating parameters and includes alarm and warning flags, which alert the equipment when particular operating parameters are outside of the factory settings.

Typically, these EEPROMs and microprocessors comply with the SFF or Small Form Factor standards, which define the I2C interface protocol and allocate certain information to specific memory locations.

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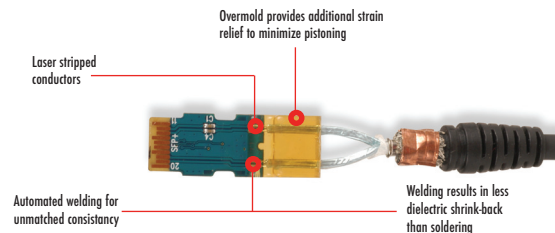
ENCRYPTION OR VENDOR LOCK

Some vendors incorporate encryption or "vendor lock" into their equipment that will issue a warning message if a non-vendor approved cable assembly is plugged into a port. Theoretically, this ensures that equipment manufacturers won't have to troubleshoot problems caused by sub-standard cables. In many cases, equipment vendors who use encryption charge more for their own cords because they lock out use of other cords. In reality, encryption is unnecessary as all reputable manufacturers of SFP+ cables and transceivers meet the standards that IEEE and SFF have established for SFP+ and interoperability is never a concern. Most network equipment vendors that employ encryption allow a work around as long as the user acknowledges the warning.   For example, the user may have to acknowledge that he understands the warning and he can accept it before moving on.

SIEMON'S SFP+ CABLES

SFP+ passive copper cable assemblies from Siemon Interconnect Solutions (SIS) are a cost-effective and lower-power alternative to optical fiber cables for short reach links in high-speed interconnect applications such as high performance computing (HPC), enterprise networking, and network storage markets.

Siemon's SFP+ connectors feature robust die cast housings and cable strain reliefs as well as gold plated contacts. They are SFF-8083, SFF-8431 and SFF-8432 compliant, which are the industry standards for this particular connector form factor.

SIEMON'S CISCO COMPATIBLE OFFERING

Siemon has offered industry standard SFP+ cables for several years which have been tested by the UNH Interoperability lab and proven to be compatible with Cisco and equipment from other major vendors. Siemon is now introducing Cisco Compatible SFP+ passive copper cables.

Siemon's Cisco compatible SFP+ passive copper cables use proprietary encryption within the assembly's EEPROM to circumvent the warning messages that Cisco equipment may produce when non-Cisco approved cables are plugged in. This allows data center designers to avoid unwarranted concern that may be associated with startups when the users see these warning messages. Siemon's cables meet the industry standards for SFP+ cables and are offered in the same lengths and wire gauges as Cisco DAC assemblies, but at a significant cost reduction.

Ordering Information:

Cisco Part Number	Siemon Cisco Compatible Part Number	Length (Meters)	Gauge (AWG)
SFP-H10GB-CU1M	SFPH10GBCU1MS	1 (3.3 ft)	30
SFP-H10GB-CU1.5M	SFPH10GBCU1.5MS	1.5 (4.9 ft)	30
SFP-H10GB-CU2M	SFPH10GBCU2MS	2 (6.6 ft)	30
SFP-H10GB-CU2.5M	SFPH10GBCU2.5MS	2.5 (8.2 ft)	30
SFP-H10GB-CU3M	SFPH10GBCU3MS	3 (9.8 ft)	30
SFP-H10GB-CU5M	SFPH10GBCU5MS	5 (16.4 ft)	24

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SIEMON'S INDUSTRY STANDARD OFFERING

Siemon has one of the industry's most comprehensive SFP+ direct attached copper cable assembly offerings, with lengths of up to 7 meters. Please visit **http://www.siemon.com/sis/** to learn more.

Ordering Information:

Siemon Industry Standard Part Number	Length (Meters)	Gauge (AWG)
SFPP30-00.5	0.5 (1.6 ft)	30
SFPP30-01	1 (3.3 ft)	30
SFPP30-01.5	1.5 (4.9 ft)	30
SFPP30-02	2 (6.6 ft)	30
SFPP30-02.5	2.5 (8.2 ft)	30
SFPP30-03	3 (9.8 ft)	30
SFPP28-05	5 (16.4)	28
SFPP24-07	7 (23.0)	24

STANDARDS

SFF-8431, "Enhanced Small Form Factor Pluggable Module SFP+", Chapter 4, "SFP+ 2 Wire Interface"
SFF-8472, "Digital Diagnostic Management Interface for Optical Transceivers"
SFF-8636, "Common Management Interface"
"InfiniBand™ Architecture Specification Volume 2, Release 1.3, PHYSICAL SPECIFICATIONS"

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